

AUXILIARY BOARD

SQUID AMP

SQUID ZAPPING NOTES:

Every time zap voltage is changed user should wait 50 seconds to charge cap.

1 SQUID can be zapped repeatedly without waiting between zaps, but if more than 1 SQUID is zapped, user should wait between zaps to allow cap to recharge.

GPIB TRIGGER
OR SOFTWARE COMMAND
INITIATES ZAP PULSE

FROM GPIB TRIG+
INTERFACE TRIG-

ZAP SQUID

SQUID ZAP capacitor is charged to SQUID ZAP voltage, then discharged into SQUID by SQUID ZAP pulse

SQUID ZAP VOLTAGE

12 BIT DAC
+/-5V

500

SQUID ZAP CAPACITOR

0.1 Farad

SQUID BIAS

12 BIT DAC
+/-5V

Ibias = 0 TO 200µA
25k

Vsignal generator : Ifeedback
1 Volt = 200µA

GAIN
12 BIT DAC
+/-5V

0 to +5V = gain of 0
0 to -5V = gain of 0 to -5

LOCKPOINT
12 BIT DAC
+/-5V

+/-8mV range
@ SQUID

FEEDBACK EXTERNAL ENABLE

OPEN/CLOSED LOOP

SWITCHES SHOWN
IN CLOSED LOOP MODE

OUTPUT SELECT

(preamp/feedback)

FEEDBACK
POLARITY

ADDER

POLARITY

VARIABLE GAIN

0 TO -5
ADJUSTS GAIN IN OPEN LOOP
-OR-
TUNES BANDWIDTH IN CLOSED LOOP,
GIVEN SQUID ARRAY LOCKPOINT dV/dI

SQUID BIAS

FEEDBACK (= GND in open loop mode)

closed loop squid amp gain:
 $V_{out} = 10 * I(QET) * R_{feedback}$

VARIABLE GAIN NOTES:

Variable gain in open loop mode is affected by SQUID bias. Variation is a function of SQUID voltage causing an offset voltage at variable gain stage input

Variation is approximately linear, so for R SQUID ~100 :
Variable Gain(actual) = Nominal*[1-bias/10]
where bias is SQUID bias in uA

QET BIAS

12 BIT DAC
+/-5V

5k
Ibias = -1mA TO +1mA

QET BIAS ENABLE

QET ZAP

100mS

+5V_{ZAP}

Izap = 10mA

511

Vsignal generator : IQET
1 Volt = 1mA

1k

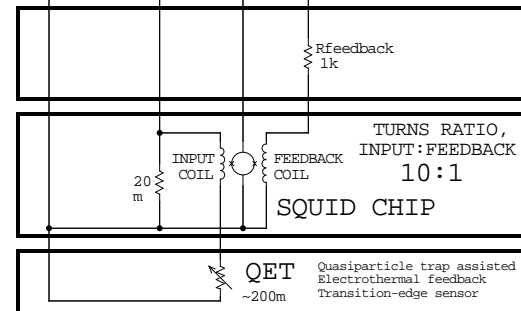
QET BIAS

QET BIAS NOTES:

ZIP 9U v1 board switching as of 14FEB00 is shown.

To zap QET, user must switch from DAC bias to external bias, initiate zap, then switch back.

Alternately user can simply increase DAC bias to maximum momentarily, then return to original value.



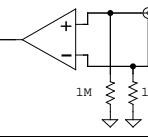
Ibias(QET) = (Ibias*20m)/~200m = 0 to ~100µA
Izap(QET) = 10mA
Pzap(QET) = ~20uW

FET BOARD
4 K

SQUID BOARD
600 mK

DETECTOR
20 mK

EXTERNAL
SIGNAL
GENERATOR
INPUT



DRIVER

DRIVER NOTES:

Offset adjust sensitivity is affected by driver gain setting. Offset adjust polarity is affected by driver polarity setting.

Driver gains shown are for a 50 load. RTF subrack does not terminate in 50 , so driver gains are actually 2X what is shown.

GAIN
X1 OR X10
POLARITY,
GAIN
X1, X1.43,
X2, OR X5

OFFSET ADJUST

TO RTF
SUBRACK

CONTRACT/BUDGET DKM	SCALE NONE	SHEET 1 of 1	TITLE DIRECT DETECTION EXPERIMENT ZIP ELECTRONICS FUNCTIONAL DIAGRAM 9U SQUID READOUT	DRAWN BY D. SEITZ
CENTER FOR PARTICLE ASTROPHYSICS University of California, Berkeley Berkeley, CA 94720-7304 (510) 642-4705			DRAWING NUMBER "9USQUIDamp_v1_diagram"	DATE 14 FEB 00
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